

Subject: Materials for July 22nd modeling discussion, part 2
From: "john.coleman" <jcoleman@glifwc.org>
Date: 7/21/2015 3:41 PM
Attachments: Fig.30_Attach.B_of_Water_Modeling_Data_Package_Vol_1-Mine_Site_v13_DEC2014.pdf (417 KB), Fig.30_with_Peter-Mitchel_pits_at_closure_level_of_1500ft.pdf (553 KB)
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Closure period modeling files:

The Barr modeling file for the closure period is named "Steady_State_west_pit_filling_Sept2014_1585ft_ec1595ft.gvw" and "SS_west_fill_Sept2014_1585ec1595.nam." It is the model run used to generate:

Large Figures 28 and 29 of the Water Modeling Data Package Vol_1-Mine_Site_v13_DEC2014, .pdf pages 510 & 511 (contaminant flowpaths)
 and

Large Figures 29 and 30 of Attachment B of Water Modeling Data Package Vol_1-Mine_Site_v13_DEC2014, .pdf pages 713 & 714 (bedrock and surficial water levels)

The model files were distributed to cooperating agencies by Bill Johnson in February of this year.

Is is described by Barr in an accompanying txt file as:

"Steady-state simulations of closure under baseline conditions:"

"West pit at 1585 feet MSL, East and Central pit at 1595 feet MSL:

Steady_State_west_pit_filling_Sept2014_1585ft_ec1595ft.gvw"

Polymet use of closure period modeling files:

Polymet predicted groundwater levels in the bedrock under long-term closure conditions using the MODFLOW model run referenced above. For example, the attached Large Figure 30 of Attachment B of the Water Modeling Data Package Vol_1-Mine_Site_v13_DEC2014 shows the bedrock water level contours predicted by that model run.

Those predicted contours were used in the Water Modeling Data Package to define flow paths (Large Figure 29 of the Water Modeling Data Package Vol_1-Mine_Site_v13_DEC2014). As stated on page 75 of the Water Modeling Data Package v13 (.pdf page 82):

"Groundwater contours for the unconsolidated deposits and bedrock are the primary source of information used to delineate the flow path areas. The groundwater contours are from the Mine Site MODFLOW model"

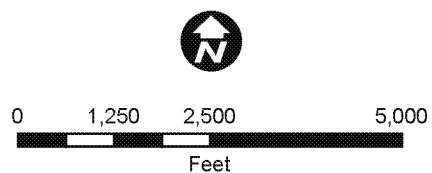
Closure period model with correct closure levels:

Using the same model "Steady_State_west_pit_filling_Sept2014_1585ft_ec1595ft.gvw" except that water levels in the Peter-Mitchel taconite pits were set at their correct long term level of 1500 feet, we find that the model predicts different groundwater contours in the bedrock (figure attached). Neither "downward leakage" nor any other parameters in the model were modified. The contours predicted by the model when the P-M pits are at their long-term closure level of 1500 ft, indicate that there are bedrock flow paths to the north from the Polymet pits. At the time of Polymet closure, the P-M pits are expected to be at an elevation of approximately 1300 ft, amplifying the effect on the aquifer.



Simulated Piezometric Surface (feet)
 Contour Interval = 10 feet

- Project Areas
- Covered Stockpile
- West Pit
- East Pit Wetland



Large Figure 30
 PREDICTED GROUNDWATER LEVELS
 WITHIN THE BEDROCK –
 LONG-TERM CLOSURE CONDITIONS
 NorthMet Project
 Poly Met Mining, Inc.



Simulated Piezometric Surface (feet)
Contour Interval 10 feet

Project Areas

Covered Stockpile

West Pit

East Pit

2500 0 2500 5000 ft

PREDICTED GROUNDWATER LEVELS
WITHIN THE BEDROCK -
LONG-TERM CLOSURE CONDITIONS
FOR NORTHMET
AND NORTHSORE PROJECTS

GLIFWC, 2015-06-28